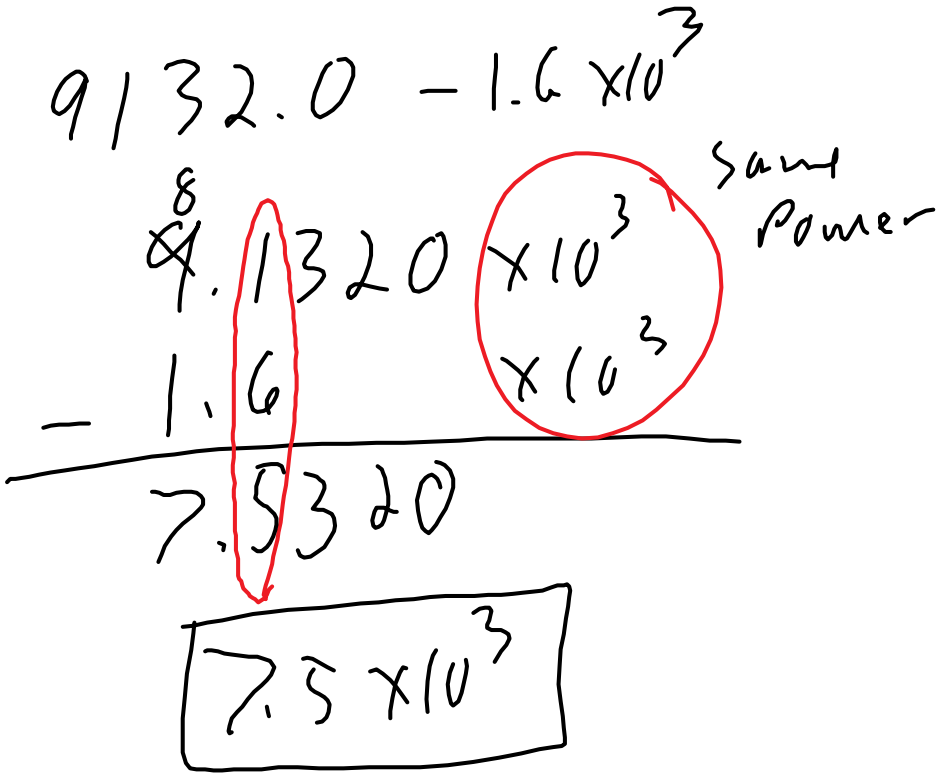
Thursday, September 14, 2017 3:14 PM



least precise decimal place= tenth

Sig fig questions
Graphing prep for pendulum lab next class

http://physics-pages.wikispaces.com/Graphing+tips

Lab reports:

What do you include?
2 types of labs: lab worksheet or a formal lab worksheet, just fill in the space
formal lab:

Title, your name (include your last initial) block
Objective or purpose: state the goal - independent (one you set) and dependent variables (changes with the independent variable)

Hypothesis/theory: general statement of the physics you are testing or using. Equations and define variables.

Method: Don't copy out of the lab manual - just say "refer to lab manual page 28-29" then write any additions/changes

Observations:
list your data in a table with units and proper sig figs
clear.

Analysis: show a sample calculation, graph your data - see graphing tips later in your notes - derive an equation from your graph.

answer questions from the lab book/sheet

Conclusion: does the data support my hypothesis/theory? (never say prove)
Write out your equation from the graph and compare to the theory.

Sources of Uncertainty - why does the data vary from theory? Try to be quantitative and give evidence.

Graphing:

what do you include for your graph?

Title - try to be descriptive - the motion of a cart on a hill is better than d vs t

Units, associated with an even scale on axes with

the independent variable on the x-axis and dependent on the y-axis.

eg. if you measure the position at certain set times, you would graph position, d vs t, d on y axis and t on x axis.

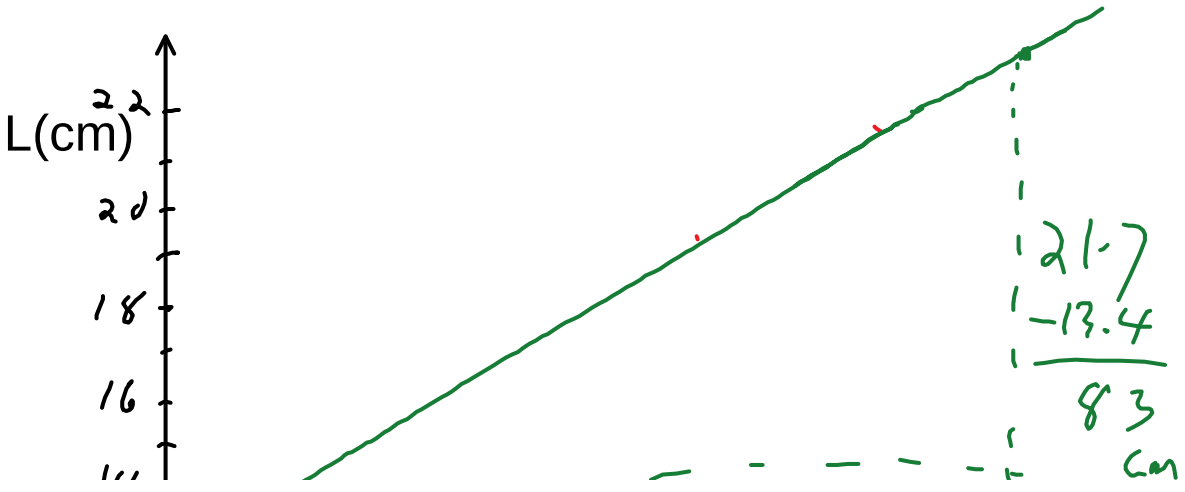
plot the points, draw a best-fit line close to the data points, shows the trend of the data (do not connect the points)

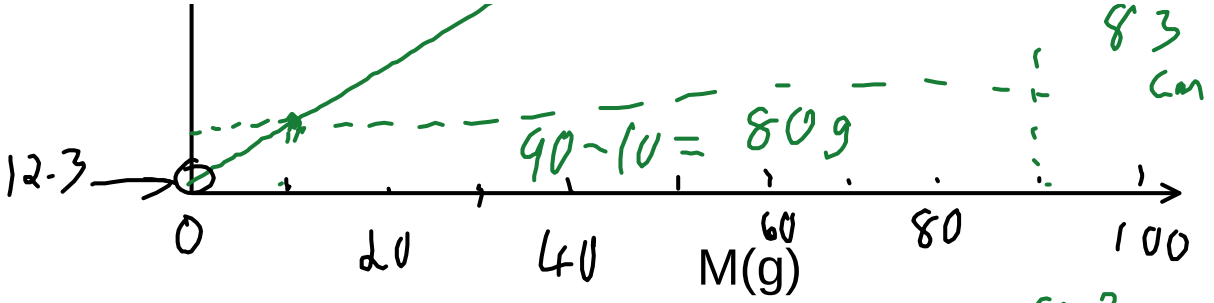
determine an equation from the best-fit line
y=mx+b if it is linear
replace each term
y is the variable on the y axis
x is the variable on the x axis
m is the slope = rise/run = $\Delta y/\Delta x = (y_2-y_1)/(x_2-x_1)$
show the rise and run on the graph as a triangle
b is the y-intercept
don't forget units for the slope and intercept

eg.
I put different weights on a spring and measure the length

Mass, M (g)	0	20	40	60	80	100
Length, L (cm)	12.2	14.3	16.1	18.5	20.3	22.7

Mass on a Spring





$\text{Slope} = \frac{\Delta y}{\Delta x} = \frac{21.7 - 13.4\text{cm}}{90 - 10\text{g}} = \frac{8.3\text{cm}}{80\text{g}}$

$m = 0.10 \frac{\text{cm}}{\text{g}}$

Don't leave as a fraction - 2 sig figs is usually good

b) 12.3 cm ← y-int.

$y = mx + b$

$L = 0.10 \frac{\text{cm}}{\text{g}} M + 12.3\text{cm}$

* yay

http://physics-pages.wikispaces.com/file/view/Graphing%20tips.pdf/560059391/Graphing%20tips.pdf
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Practice Problems

1. Graph the following data and state an equation for each graph.

a) The circumferences and diameters of various circles were measured and recorded. What is the relationship between circumference and diameter?

Circumference, c (cm)	3.1	6.3	8.4	12.6	15.7
Diameter, D (cm)	1.0	2.0	3.0	4.0	5.0

b) A car accelerated from 0 to 34 m/s in 7 seconds. Plot a graph of the trip and find the

relationship between velocity and time.

Velocity, v (m/s)	0	5	11	14	22	26	30	34
Time, t (s)	0	1	2	3	4	5	6	7

Block 2-3
Sig fig questions
Graphing prep for pendulum lab next class

http://physics-pages.wikispaces.com/Graphing+tips

Lab reports:

2 types: Labsheet - fill in the blanks
Formal Lab reports

Title - name (with last initial) block
Purpose- to find the relationship between an independent variable (the one you set) and a dependent variable (changes when you change the other variable).

eg. You put different weights on a spring and see the effect on the length of the spring.
independent: weights
dependent: length

Hypothesis/theory: the physics principles you are testing or using to make an educated guess about the outcome. Define variables

eg. If you add more weights, the spring will be

longer - Hooke's Law F=kx , F is force on the spring, x is the change in length, k is elastic constant.

Materials and Procedure: Don't copy them out of the lab manual or sheet, just write "refer to lab manual p28,29". Write out changes.

Observations: Put your data in a table with units and proper sig figs.

Analysis: show sample calculations, graph the data - see later for detailed notes.
Answer any lab questions.

Conclusion: Does the data support your hypothesis? How closely - %error.
Do not say "prove".

Sources of Uncertainty - What factors may have caused your data to be off the theory? Be quantitative and give evidence.

Details of the graph.
purpose of the graph is to derive an equation showing the relationship between variables.

Title
labels with units for the axes, with an even scale
- look at the range of the data to decide on the scale - make it big - data fills the graph

plot the points
see if it looks linear or non-linear (Tuesday)
if it is linear, draw a best-fit line with a ruler close to the data points, shows the trend
DO NOT CONNECT THE DOTS

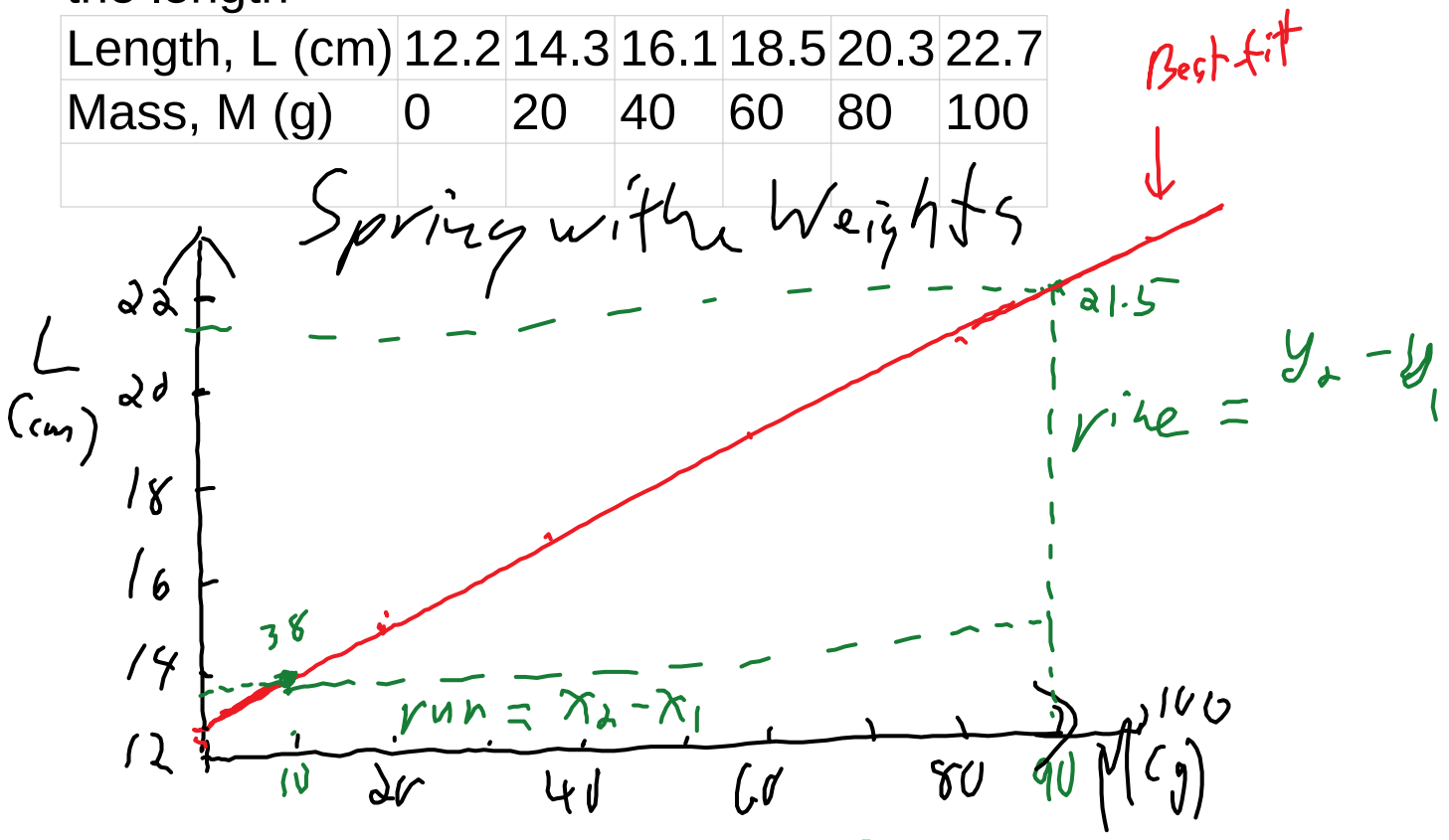
get the equation of the form y=mx+b
and replace each term
y - y axis variable
x is x axis variable
m is slope = rise/run = $\Delta y/\Delta x = (y_2-y_1)/(x_2-x_1)$
b is the y-intercept - can be negative

don't forget units and sig figs for m and b
2 sig figs is usually fine

don't leave as a fraction or repeating value

eg.
I put different weights on a spring and measure the length

Length, L (cm)	12.2	14.3	16.1	18.5	20.3	22.7
Mass, M (g)	0	20	40	60	80	100



$$\text{Slope} = m = \frac{21.5\text{cm} - 3.8\text{cm}}{90\text{g} - 10\text{g}} = \frac{17.7\text{cm}}{80\text{g}}$$

$= 0.22$ $= \boxed{0.22 \frac{cm}{g}}$

y-int $= 12.4 cm$ (line hits y-axis)

$y = mx + b$

$\boxed{L = 0.22 \frac{cm}{g} M + 12.4 cm}$